

Remarks

In the office action, claims 1, 2, 4, 8-11, 13 and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by German Utility Model No. DE 1893773 ("DE 773"). In addition, claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over DE 773 in view of U.S. Patent No. 4,998,740 to Tellier ("Tellier"). Finally, claims 3, 5, 12, and 15-20 were deemed to be allowable if rewritten in independent form.

In this response, Applicants have amended claims 1 and 17-19 to correct minor typographical errors without altering their scope. Claims 1-20 continue to be pending. Reconsideration and withdrawal of the rejections is requested in view of the following remarks.

A. Rejections under 35 U.S.C. § 102 (DE 773):

Claims 1, 2, 4, 8-11, 13 and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by DE 773.

In discussing the rejection, the examiner refers to features with corresponding reference numerals in the drawings of DE 773, that appear not to be present in those drawings, which use reference letters instead of numbers. See Office Action, page 2, subparagraphs 1-6. For example, Applicants was unable to determine what was meant by the following references on page 2 of the Office Action: "housing wall (13)" (subparagraph 1); "outer ring (near 4)" (subparagraph 2); "outer ring (3)" and "generally folded portion near 4" (subparagraph 3); and shaft 1 (subparagraph 5). In addition, the Examiner appears to be combining elements from different seals described in DE 773, which would not be proper for an anticipation rejection, since the Examiner does not allege that DE 773 describes a seal having all of the features recited in the claims.

Applicants have nevertheless attempted to respond to the rejection as best understood and including a detailed description of the different seals described in DE 773 and illustrated in the drawings.

DE 773 describes various embodiments of an elastic ring-shaped seal. Fig. 1 of DE 773 shows a radial shaft seal made of two independent parts: a plastic ring e and a metal elbow torsion ring h including rows of spring fingers i and k. The spring fingers i and k press the exterior wall of the plastic ring e radially outwardly against the outer housing b and the interior wall of the plastic ring e (sealing surface f) against the shaft a. A beading l at the exterior wall of

the plastic ring e extending into the housing b can prevent the shaft seal from an axial sliding within the housing b.

Figs. 2-4 of DE 773 show various embodiments of an axial bearing seal including an annular groove in the outer ring of a ball bearing in which a torsion spring sealing part e extends into. In each case, the spring sealing part presses itself through its springiness in a sealing manner against both the wall of the annular ring u as well as against the inner ring of the ball bearing.

Fig. 5 of DE 773 shows an axially elastic shaft seal that presses against a gas or fluid pressure acting in the direction II. The seal of Fig. 5 includes a metal torsion ring h having spring fingers i and k covered with a plastic layer e. The spring fingers k extend into the outer beading of plastic coating e and press in a sealing manner against the wall of the housing b or against an annular groove u in the housing b. The spring finger i extends into the inner beading of plastic coating e and presses against a shaft collar x. The metal elbow torsion ring h springs about its circular torsion axis.

Independent claim 1 recites an axial shaft seal disposed between a housing wall and a rotating shaft. The axial shaft seal includes:

- an outer ring insertable into the housing wall in a stationary and sealing manner, the outer ring including a sleeve including a polymer material having a curved bellows form and providing a spring, the curved bellows form extending radially inward over its entire length, a radially inward end portion of the sleeve having a first sealing surface; and

- an inner ring connectable to the shaft in a non-twisting and sealing manner and including a ring flange extending radially outward so as to provide a second sealing surface for axially mating the first sealing surface, wherein the spring urges the first sealing surface against the second sealing surface.

Applicants respectfully submit that DE 773 does not describe all of the features of independent claim 1. Specifically, in each of the embodiments, DE 773 describes a torsion spring that provides a seal by pressing against both the inner and outer walls of a gap. In the embodiment shown in Figs. 1 of DE 773, for example, the seal presses between the outer housing wall and the radially outer wall of the shaft. The seal of Fig. 1 thus does not include at least the feature of an inner ring connectable to the shaft.

The seals shown in Figs. 2-4 of DE 773, are not shaft seals at all, but rather ball bearing seals. Moreover, those seals are shown pressing directly against the inner ring of the ball bearing

or against a groove in the inner ring of the ball bearing. The seals of Figs. 2-4 therefore, also do not include at least the feature of “an inner ring connectable to [a] shaft in a non-twisting and sealing manner” as that term of claim 1 is properly interpreted.

Only the seal of Fig. 5 in of DE 773 (“the Fig. 5 seal”) includes a sealing surface for axially mating an extension of a shaft. Nevertheless, the Fig. 5 seal also differs in at least four important ways from the invention recited in claim 1. First, the Fig. 5 seal does not include an outer ring “insertable into the housing wall in a stationary and sealing manner” as that term is properly understood in claim 1. Rather, DE 773 describes the Fig. 5 seal as simply being pressed against the outer housing wall (or against an outer wall of groove u) by the spring action of torsion spring h. Second, the Fig. 5 seal does not include “a radially inward end portion of the sleeve having a first sealing surface”. The radially inward end portion of the Fig. 5 seal does not have a sealing surface. Instead, the Fig. 5 seal includes a sealing surface that is positioned radially outward from the radially inward end portion of plastic coating e. Third, the Fig. 5 seal does not include “an inner ring connectable to the shaft in a non-twisting and sealing manner and including a ring flange extending radially outward so as to provide a second sealing surface for axially mating the first sealing surface.” DE 773 does not describe how the collar x is formed. From Fig. 5, which shows the diameter of the shaft being larger on the left side of the collar x than the right, it appears that collar x is an integral portion of the shaft itself and not “an inner ring connectable to the shaft” that includes a ring flange. Fourth, the Fig. 5 embodiment does not include a “polymer material having a curved bellows form and providing a spring . . . wherein the spring urges the first sealing surface against the second sealing surface”. Rather, the Fig. 5 seal relies on metal torsion ring h – and not a polymer material -- for providing the spring between the plastic coating e and the collar x.

Accordingly, withdrawal of the rejection to claims 1, 2, 4, 8-11, 13 and 14 under 35 U.S.C. §102(b) as anticipated by DE 773 is respectfully requested.

B. Rejections under 35 U.S.C. § 103:

Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over DE 773 in view of Tellier.

Tellier describes a face seal assembly to prevent fluid leakage between assembled structural components such as housing components of a fluid control valve that includes an

annular shaped metal seal member and parallel deflectable seal legs.

Claims 6 and 7 depend from independent claim 1 and include all of its elements. As discussed above, DE 773 does not describe all of the features of claim 1, and in fact differs from the invention of claim 1 in many significant ways. Applicants further submit that DE 773 also does not teach or suggest all of the features recited in claim 1. Tellier, which describes a different type of sealing device altogether, does not cure the deficiencies of DE 773.

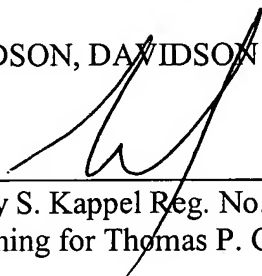
Withdrawal of the rejection to claims 6 and 7 under 35 U.S.C. § 103 is respectfully requested.

CONCLUSION

For at least the reasons stated above, Applicant requests withdrawal of the rejections to claims 1-16. It is respectfully submitted that the application is now in condition for allowance. Should the Examiner feel that an interview would advance prosecution of the present application, the Examiner is invited to contact the undersigned.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 
Cary S. Kappel Reg. No. 36,561
(signing for Thomas P. Canty, Reg. No. 44,586)

Davidson, Davidson & Kappel, LLC
485 Seventh Avenue - 14th Floor
New York, New York 10018
(212) 736-1940